HIGH SCHOOL ENTRANCE EXAMINATION BOARD

DEPARTMENTAL EXAMINATIONS, 1938

GRADE IX

MATHEMATICS

GEOMETRY

Note: Pupils will do all work on these booklets and return them as their answer papers.

Time–1½ hours.

In questions 1, 2, 3, 4, 5 and 6 put *a*, *b*, *c* or *d* in the rectangle at the right to show how each sentence should be completed. In questions 7 (*b*), 7 (*e*), 8, 9, 10 write the answers in the rectangle.

Values

2 **1.** In 6 minutes the minute hand of a clock turns through (*a*) 6 degrees, (*b*) 10 degrees, (*c*) 15 degrees, (*d*) 36 degrees. d

2 **2.** The complement of the angle of 87° 20′ contains (*a*) 2° 40′, (*b*) 87° 20′, (*c*) 92° 40′, (*d*) 272° 40′.

2 **3.** A rectangle is a parallelogram in which the adjacent sides are (*a*) horizontal, (*b*) parallel, (*c*) perpendicular to each other, (*d*) vertical. c

2 **4.** A polygon of six sides is called a (*a*) decagon, (*b*) octagon, (*c*) hexagon, (*d*) pentagon. c

2 **5.** If the angles of two isosceles triangles are respectively equal, the triangles must be (*a*) equal, (*b*) similar, (*c*) congruent, (*d*) similar and congruent. d

2 **6.** If the line drawn from the vertex of a triangle to the middle point of the base is perpendicular to the base, the triangle is (*a*) always equilateral, (*b*) always isosceles, (*c*) always scalene, (*d*) always right-angled. b

Values

7.

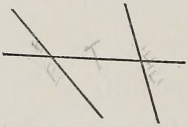


FIG. 1

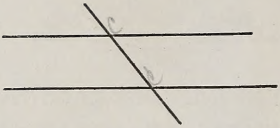


FIG. 2

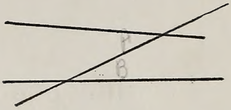


FIG. 3

1 (*a*) Write *T* on a transversal in figure 1.

1 (*b*) How many transversals are there in figure 1?

3

1 (*c*) Write *E* on each exterior angle in figure 1.

1 (*d*) Write *C* on one pair of corresponding angles in figure 2.

1 (*e*) How many pairs of corresponding angles are there in figure 2?

H

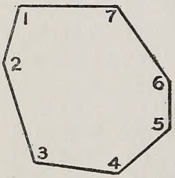
1 (*f*) Find one pair of alternate interior angles in figure 3. Write *A* on one of these angles and *B* on the other.

Do your figuring in this column

3 **8.** If a photograph which measures $2\frac{1}{2}$ inches by $3\frac{1}{4}$ inches is enlarged so that the shorter side is $6\frac{1}{4}$ inches, what is the length in the enlargement of a line segment which was $\frac{7}{8}$ inch long in the original?

4 What area in the enlargement corresponds to an area of 1 square inch in the original?

5 **9.** The figure below is a polygon with seven sides. What is the sum of the angles marked 1, 2, 3, 4, 5, 6 and 7?



8 **10.** It is found that a rope *CD*, 50 ft. long, attached to the top of a wall will reach a point on the ground 17 ft. from the foot of the wall. Use the table of squares and square roots of numbers on the next page to find to what distance from the foot of the wall a rope 65 ft. long will reach.

2500 - 289 = 22
4225 - 2211 = 20

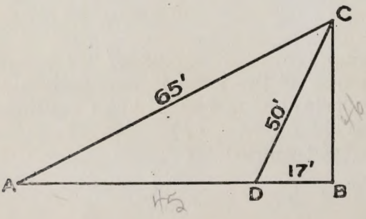


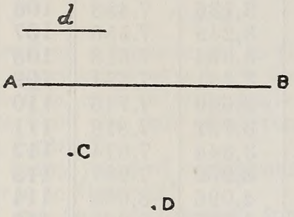
Table of Squares and Square Roots of Numbers

No.	Squares	Square Roots	No.	Squares	Square Roots	No.	Squares	Square Roots
1	1	1.000	**51**	2,601	7.141	**101**	10,201	10.050
2	4	1.414	**52**	2,704	7.211	**102**	10,404	10.100
3	9	1.732	**53**	2,809	7.280	**103**	10,609	10.149
4	16	2.000	**54**	2,916	7.348	**104**	10,816	10.198
5	25	2.236	**55**	3,025	7.416	**105**	11,025	10.247
6	36	2.449	**56**	3,136	7.483	**106**	11,236	10.296
7	49	2.646	**57**	3,249	7.550	**107**	11,449	10.344
8	64	2.828	**58**	3,364	7.616	**108**	11,664	10.392
9	81	3.000	**59**	3,481	7.681	**109**	11,881	10.440
10	100	3.162	**60**	3,600	7.746	**110**	12,100	10.488
11	121	3.317	**61**	3,721	7.810	**111**	12,321	10.536
12	144	3.464	**62**	3,844	7.874	**112**	12,544	10.583
13	169	3.606	**63**	3,969	7.937	**113**	12,769	10.630
14	196	3.742	**64**	4,096	8.000	**114**	12,996	10.677
15	225	3.873	**65**	4,225	8.062	**115**	13,225	10.724
16	256	4.000	**66**	4,356	8.124	**116**	13,456	10.770
17	289	4.123	**67**	4,489	8.185	**117**	13,689	10.817
18	324	4.243	**68**	4,624	8.246	**118**	13,924	10.863
19	361	4.359	**69**	4,761	8.307	**119**	14,161	10.909
20	400	4.472	**70**	4,900	8.367	**120**	14,400	10.954
21	441	4.583	**71**	5,041	8.426	**121**	14,641	11.000
22	484	4.690	**72**	5,184	8.485	**122**	14,884	11.045
23	529	4.796	**73**	5,329	8.544	**123**	15,129	11.091
24	576	4.899	**74**	5,476	8.602	**124**	15,376	11.136
25	625	5.000	**75**	5,625	8.660	**125**	15,625	11.180
26	676	5.099	**76**	5,776	8.718	**126**	15,876	11.225
27	729	5.196	**77**	5,929	8.775	**127**	16,129	11.269
28	784	5.292	**78**	6,084	8.832	**128**	16,384	11.314
29	841	5.385	**79**	6,241	8.888	**129**	16,641	11.358
30	900	5.477	**80**	6,400	8.944	**130**	16,900	11.402
31	961	5.568	**81**	6,561	9.000	**131**	17,161	11.446
32	1,024	5.657	**82**	6,724	9.055	**132**	17,424	11.489
33	1,089	5.745	**83**	6,889	9.110	**133**	17,689	11.533
34	1,156	5.831	**84**	7,056	9.165	**134**	17,956	11.576
35	1,225	5.916	**85**	7,225	9.220	**135**	18,225	11.619
36	1,296	6.000	**86**	7,396	9.274	**136**	18,496	11.662
37	1,369	6.083	**87**	7,569	9.327	**137**	18,769	11.705
38	1,444	6.164	**88**	7,744	9.381	**138**	19,044	11.747
39	1,521	6.245	**89**	7,921	9.434	**139**	19,321	11.790
40	1,600	6.325	**90**	8,100	9.487	**140**	19,600	11.832
41	1,681	6.403	**91**	8,281	9.539	**141**	19,881	11.874
42	1,764	6.481	**92**	8,464	9.592	**142**	20,164	11.916
43	1,849	6.557	**93**	8,649	9.644	**143**	20,449	11.958
44	1,936	6.633	**94**	8,836	9.695	**144**	20,736	12.000
45	2,025	6.708	**95**	9,025	9.747	**145**	21,025	12.042
46	2,116	6.782	**96**	9,216	9.798	**146**	21,316	12.083
47	2,209	6,856	**97**	9,409	9.849	**147**	21,609	12.124
48	2,304	6.928	**98**	9,604	9.899	**148**	21,904	12.166
49	2,401	7.000	**99**	9,801	9.950	**149**	22,201	12.207
50	2,500	7.071	**100**	10,000	10.000	**150**	22,500	12.247

[OVER]

Values

10 **11.** Find all points which are at a distance *d* from *AB* and also equidistant from the two given points *C* and *D*. Complete the construction in the figure below. Explain your construction in the space below, and show that you have solved the problem given.



Values

12. In the space at the right draw a figure (or figures) to illustrate each theorem. Naming the particular parts of the figures, state what facts are given and what conclusions are to be proved.

3 (*a*) The diagonals of a rhombus bisect each other at right angles.

Given: ....

....

....

Prove: ....

....

....

3 (*b*) If two triangles are congruent, their corresponding medians are equal.

Given: ....

....

....

Prove: ....

....

....

3 (*c*) If the arms of one angle are parallel to the arms of another, the angles are either equal or supplementary.

Given: ....

....

....

Prove: ....

....

....

Values

3 (*d*) In an isosceles triangle the altitudes drawn to the equal sides are equal.

Given: ....

....

....

Prove: ....

....

....

3 (*e*) If in an isosceles triangle lines are drawn parallel to the equal sides from any point on the third side, prove that the sum of the four sides of the parallelogram thus formed is equal to the sum of the two equal sides of the triangle.

Given: ....

....

....

Prove: ....

....

....

12 **13.** *Either* { Divide a given straight line-segment into five equal parts. (Construction 7).

Or { If three or more parallels intercept equal segments on one transversal, they intercept equal segments on every other transversal. (Theorem 19).

(Use this space for diagram)

(Use this space for explanation and proof of number 13.)

(Continue on back of this sheet if necessary)